

WHAT IS CLAIMED IS:

1. A method for assembling a combustor for a gas turbine engine, said method comprising:

coupling an inner liner to an outer liner such that a combustion chamber is defined therebetween;

positioning an outer support a distance radially outward from the outer liner;

positioning an inner support a distance radially inward from the inner liner;

forming at least two rows of impingement openings extending through at least one of the inner support and the outer support for channeling impingement cooling air therethrough towards at least one of the inner liner and the outer liner; and

forming at least one row of dilution openings extending through at least one of the inner liner and the outer liner for channeling dilution cooling air therethrough into the combustion chamber.

2. A method in accordance with Claim 1 wherein forming at least one row of dilution openings further comprises:

forming a row of first primary dilution openings that each have a first diameter; and

forming a row of second primary dilution openings that each have a second diameter that is larger than the first diameter of the first primary dilution openings.

3. A method in accordance with Claim 2 wherein forming a row of second primary dilution openings further comprises forming the row of second primary dilution openings such that each of the second primary dilution openings is between a pair of adjacent first primary dilution openings.

4. A method in accordance with Claim 1 further comprising forming a plurality of film cooling openings extending through at least one of said inner liner and said outer liner for channeling cooling air for film cooling of at least one of said inner liner and said outer liner, wherein the plurality of film cooling openings are in flow communication with the at least two rows of impingement openings.

5. A method in accordance with Claim 4 wherein forming at least one row of dilution openings further comprises forming the dilution openings such that a pressure differential across the at least two rows impingement openings is substantially equal to a pressure differential across the at least one row of dilution openings and said plurality of film cooling openings.

6. A combustor for a gas turbine engine, said combustor comprising:

an inner liner;

an outer liner coupled to said inner liner to define a combustion chamber therebetween;

an outer support radially outward from said outer liner such that an outer passageway is defined between said outer support and said outer liner; and

an inner support radially inward from said inner liner such that an inner passageway is defined between said inner support and said inner liner, at least one of said inner support and said outer support comprising at least two rows of impingement openings arranged in an array and extending therethrough for channeling impingement cooling air towards at least one of said inner liner and said outer liner, at least one of said inner liner and said outer liner comprising at least one row of dilution openings extending therethrough for channeling dilution cooling air into said combustion chamber.

7. A combustor in accordance with Claim 6 wherein said at least one row of dilution openings facilitate radially and circumferentially reducing exit flow temperatures from said combustor.

8. A combustor in accordance with Claim 6 wherein said at least one row of dilution openings further comprises a row of first primary dilution openings having a first diameter, and a row of second primary dilution openings having a second diameter that is larger than said first diameter.

9. A combustor in accordance with Claim 8 wherein said combustor comprises an equal number of said first primary dilution openings and said second primary dilution openings.

10. A combustor in accordance with Claim 8 wherein each said second primary dilution opening is between a pair of adjacent said first primary dilution openings.

11. A combustor in accordance with Claim 8 wherein at least one of said inner liner and said outer liner further comprises a plurality of film cooling openings extending therethrough for channeling cooling air for film cooling of at least one of said inner liner and said outer liner.

12. A combustor in accordance with Claim 11 wherein a pressure differential across said at least two rows impingement openings is substantially equal to a pressure differential across said at least one row of dilution openings and said plurality of film cooling openings.

13. A gas turbine engine comprising a combustor comprising at least one injector, an inner liner, an outer liner, an outer support, and an inner support, said inner liner coupled to said outer liner to define a combustion chamber therebetween, said inner and outer liners further defining a dome opening, said injector extending substantially concentrically through said dome opening, said outer support spaced radially outward from said outer liner, said inner support spaced radially inward from said inner liner, at least one of said inner support and said outer support comprising at least two rows of impingement openings arranged in an array and extending therethrough for channeling impingement cooling air towards at least one of said inner liner and said outer liner, at least one of said inner liner and said outer liner

comprising at least one row of dilution openings extending therethrough for channeling dilution cooling air into said combustion chamber.

14. A gas turbine engine in accordance with Claim 13 wherein said combustor at least one row of dilution openings facilitate radially and circumferentially controlling distortion in exit flow temperatures from said combustor.

15. A gas turbine engine in accordance with Claim 14 wherein a number of said combustor first primary dilution openings is equal to a number of said combustor second primary dilution openings.

16. A gas turbine engine in accordance with Claim 14 wherein said combustor at least one row of dilution openings further comprises a row of first primary dilution and a row of second primary dilution openings, each of said first primary dilution openings has a first diameter that is smaller than a second diameter of each of said second primary dilution openings.

17. A gas turbine engine in accordance with Claim 16 wherein each said combustor second primary dilution opening is between a pair of adjacent said first primary dilution openings.

18. A gas turbine engine in accordance with Claim 16 wherein said combustor further comprises a plurality of air swirlers, each said combustor first primary dilution opening is aligned downstream from, and substantially axially along a centerline of, each said air swirler.

19. A gas turbine engine in accordance with Claim 14 wherein at least one of said inner liner and said outer liner further comprises a plurality of film cooling openings for channeling cooling air therethrough for film cooling at least one of said inner liner and said outer liner.

20. A gas turbine engine in accordance with Claim 19 wherein a pressure differential across said combustor array of impingement openings is

substantially equal to a pressure differential across said at least one row of dilution openings and said plurality of film cooling openings.